EDIC/ID-37
Control No. 487551
16 July 1958

MEMORANDUM FOR: Economic Defense Intelligence Committee

FROM : Chairman, EDIC

File Copy

SUBJECT : The Tire Industry in the Sino-Soviet Bloc

REFERENCE : EDIC Case No. 29, SECRET

1. The attached intelligence document has been prepared by CIA in response to the referenced EDIC Case No. 29 initiated by the Department of Commerce. It is now distributed for review and acceptance by EDIC members.

2. If no request for consideration of this document in an EDIC meeting is received before the close of business 25 July 1958 it will be regarded as approved and the case will be closed.

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Chairman

Attachment:
The Tire Industry in the Sino-Soviet Bloc

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Deputy Director (Coordination)

SECRET

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THE TIRE INDUSTRY IN THE SINO-SOVIET BLOC

I. Pneumatic Tire Casings

A. Sino-Soviet Bloc Supply Position

The USSR and the other industrial countries in the Sino-Soviet Bloc produce all types of pneumatic tires, ranging from scooter and motorcycle sizes up to large tires needed for aircraft, heavy trucks, and earthmovers. In 1957 the total Sino-Soviet Bloc production, including aircraft and motorcycle tires, was more than 20 million units, an increase of 94 percent over 1950 production. In spite of this increase, there still exists a deficit of tires within the Bloc as a whole. 1/ In order to overcome this deficiency, Bloc plans call for a 50-percent increase in production in 1960 above that in 1957. Production of motor vehicles in recent years has been increasing at an average rate of about 6 percent, and, apart from China, there is no indication of efforts to boost that rate of growth.

Outside the USSR, tire production appears more than adequate to meet domestic requirements; however, a serious tire shortage appears to exist within the USSR. This condition is due primarily to the low quality of the tires produced. It is estimated that the average Soviet motor vehicle travels 28,000 kilometers annually. Soviet tires have an average useful life of about 30,000 kilometers. Thus, the entire motor park must be re-equipped with new tires every year. Both Poland and the USSR have announced the objective of increasing the average tire mileage from 30,000 kilometers to 40,000 kilometers by 1960. The Soviets have estimated that an increase of 10 percent in tire life would save 50 million rubles a year for every million tires in use, and Mr. Khrushchev, in his recent report to the Party Central Committee on the expansion of the chemical industry said, "Synthetic fibers are also extremely important in industry. Thus, the use of capron cord instead of cotton or rayon cord in the manufacture of tires reduces the expenditure of rubber by 15 percent and at the same time increases the life of the tires by 30 to 40 percent."

It is estimated that at least 80 percent of the tires made in the USSR are in the larger sizes suitable for trucks. Tire production in the Satellites is believed to be approximately two-thirds for trucks and one-third for passenger cars.

1/ Table 1 attached shows the breakdown of production by countries as well as their calculated requirements based on the estimated motor park and production of motor vehicles.

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No statistics are available on the use pattern of tires within the Bloc. An approximate estimate assigns 55 percent to trucks, 25 percent to direct military use, and the balance of 20 percent to busses, passenger cars, and other civilian uses. No figures are published on the production of tires by sizes or types, and even if these were available, the military and non-military consumption could be only roughly estimated. Obviously aircraft, passenger cars, motorcycles, and trucks are used by both the military and civilians. Earthmovers and similar types of heavy equipment in many cases take the same sizes of tires as some field guns. In short, most sizes of tires have both military and civilian applications. Tractors, motorcycles, and aircraft probable require less than 10 percent of the total tires consumed in the Bloc. This estimate is based on the number of vehicles of these types produced and in use. These categories are not included in the statistics given in Table 1 - hence the deficit shown in that table can be considered to be a minimum figure.

B. Trade

Trade in motor vehicle tires between the Sino-Soviet Bloc and the Free World is relatively insignificant. Imports by the Bloc in 1956 were valued at about $5 million, and exports were equally modest. Czechoslovakia has a substantial number of tires available for export and during the past few years has attempted to develop a market in Turkey and South America. However, the quality has been so inferior that buyers have demanded refunds. Soviet tires on equipment shipped to Afghanistan were said to fail after 500 to 2,000 miles of service. Communist China shipped some 30,000 tires to Ceylon in 1957 as partial payment for goods received. Figures on shipments by individual countries are too fragmentary to establish a pattern. Bloc wheeled equipment sent to foreign countries is supplied with Bloc-made tires, but in general it appears that their reputation for inferior quality has made potential customers cautious.

C. Quality

Apart from the obsolete tire-making machinery and equipment 2/, the inferior quality of Bloc tires is attributable largely to the inferior components used in production.

1. Rubber - Generally speaking, the Bloc has sufficient supplies of rubber, both synthetic and natural, to build tires of satisfactory quality. The kinds of rubber used varies in different countries. For instance, China uses natural rubber exclusively, and East Germany uses only 20 percent or even less of natural rubber in making tires.

2. Tire Cord probably is the principal factor in tire life. In the USSR it has been estimated that one-half of all tire failures are due to mechanical deficiencies such as blow-outs, tread separation, etc. About

2/ For detailed comments on tire-making machinery in the Sino-Soviet Bloc see Section II below.

two-thirds of Soviet tires are made with cotton cord, the remainder predominantly with rayon cord. The limited amounts of nylon cord available are used for aircraft tires. China's tires are all made with cotton cord, while East German and Czechoslovak tires are principally made with rayon cord. Cotton cord rates the poorest from the point of view of resistance to heat and overloading of tires. Rayon is better than cotton and also has a higher tensile strength, whereas nylon is the best material for tire cord which has been found to date.

3. Carbon Black also is an important factor in the life of tires. This is particularly true of tires containing synthetic rubber. The Sino-Soviet Bloc has adequate supplies of carbon black. Its quality, however, cannot be compared with the new types of "high abrasion" blacks which have been developed in the US since World War II. The latter will add from 25 to 40 percent more mileage to the life of a tire. The Soviets have made, and are continuing to make, efforts to acquire the technology of "know-how" for making these types of black, so far without success. The US companies which have developed their own processes for making high-abrasion blacks do not wish to part with their "trade secrets."

4. Beadwire is important, as it serves to hold the tires to the wheel-rims. The Communist countries follow US practice, except their wire is plated with zinc instead of copper or bronze. Bloc supplies of high-tensile wire are ample for their tire needs.

5. Rubber Chemicals - Chemicals needed for compounding rubber appear to be in adequate supply for their requirements.

D. Plans for Expansion

All of the countries in the Bloc have planned expansion of their tire output by 1960. The USSR, where the most severe shortage exists, plans an increase of about 60 percent in the 3 years, and a further increase of 35 percent by 1965 above 1960 production. In order to attain these goals, Khrushchev has indicated that it will be necessary to import modern equipment and technology from the West. The first of these modern plants is being built by the UK and will have a capacity of 2 million tires per year, 80 percent of which will be large sizes for trucks and military vehicles. The Russians have indicated that they expect to build five such plants, although it is probable that they hope to obtain much of the necessary machinery from outside the Bloc. In the 2-year trade agreement between the USSR and France the latter agreed to furnish 50 tire-molding presses to the USSR in 1957 and 50 more in 1958. These presses could add a half-million tires to Soviet production capacity.

II. Tire Manufacturing Machinery

A. Sino-Soviet Bloc Supply Position

By Western standards, most of the tire-building machinery installed in the Sino-Soviet Bloc tire plants is obsolete. For example, the best factory

in the USSR - the major Bloc tire producer - is said to be the Moscow Tire Plant. This plant is basically the old Ford "River Rouge" plant which was sent to the USSR under "Lend-Lease" during World War II. The equipment for this plant was built in 1935-1936 and is now more than 20 years old. While additions and replacements have been made since, the plant remains obsolete, requires a disproportionate amount of manual labor, and boasts of few modern innovations. The other tire plants in the Bloc are not believed to be any better equipped.

Tire-manufacturing machinery is produced in the USSR, East Germany, Czechoslovakia, and in Communist China. However, only the USSR, East Germany, and Czechoslovakia have any significant production, and the technological level of their output is generally below that of Western tire machinery manufacturing plants. As a result, the Sino-Soviet Bloc as a whole relies heavily on Western machinery to modernize its tire plants. The USSR, in 1957, signed a contract with the United Kingdom for the purchase of a modern tire plant with an annual capacity of 2 million tires at a cost expected to exceed 28 million dollars. Also, under the terms of the current Franco-Russian trade agreement, France was to export 50 tire presses to the USSR in 1957 and another 50 before the end of 1959. On the other hand, the Bloc has also engaged in some exports of tire-manufacturing machinery. Indonesia ordered a tire plant from Czechoslovakia in 1956, and East Germany has offered to supply such machinery to Uruguay.

Judging from Russian orders for tire manufacturing equipment from the West and from complaints in the Soviet press about domestically produced equipment, it appears evident that the Russians are not producing enough of the necessary types of machinery to satisfy their requirements, and the equipment which is being manufactured is technically obsolete.

The USSR tire equipment production capability is substantially supplemented by two plants in Czechoslovakia and East Germany. Thus the Bloc could probably get along without purchases of Western equipment. However, the USSR is interested in buying the most up-to-date machinery - which thus far has been available only in the West - in order to augment its tire-making capacity and to increase the productivity of existing plants.

B. Tire-making Machinery Production and Production Problems

1. USSR

Data on Soviet production of tire-making machinery is sparse. The USSR has published no statistics on the quantity of production and little information on the types of machinery being produced. Several plants are manufacturing tire-making equipment along with other types of machinery, the largest and most specialized plant being the Bolshevik Chemical Machinery Plant in Kiev. Judging by the information available, the product-mix and the quality of equipment is inadequate to meet the needs of the tire industry. Rubber mixers and calenders produced in 1956 were no different from those produced 20 years ago. The mixers are produced in only one type-size and

with a single shaft-speed, although the modern rubber industry requires three type-sizes of mixers and the shafts of large mixers should have two speeds. Cord calenders have speeds less than half of those of the best Western types, with a primitive and inefficient system of regulating the thickness of the rubber layer. As a result, the variation of thickness is ten times as great as in modern calender designs. Only individual vulcanizers are produced for motor vehicle tires. Consequently, the tires must be molded prior to vulcanization and a large number of molds must be used, whereas modern tire plants use automatic vulcanizer presses for this purpose.

A Soviet engineer, writing an article on the technology of tire production in the June 1957 edition of Mekhanizatsiya Trudoyemkikh i Tyzhelykh Rabot (Mechanization of Labor-Consuming and Heavy Work), stated that the USSR is increasing the mechanization of her tire plants, but that many basic and auxiliary processes have not as yet been mechanized. Thus loading and unloading, distribution, and storage operations should be fully mechanized since they require a large amount of manual labor. Towards this end, he stated, the USSR had designed a standard hopper storage for carbon black and had planned a system of worm conveyers for the distribution of carbon black to the hoppers and for subsequent unloading. The introduction of such automatic equipment which would mechanize the process of mixing carbon black would, according to the writer, permit an annual saving in excess of 20 million rubles. He admitted, however, that mechanized storage facilities were being built so slowly that not one of them had been put into actual operation at the time of his writing.

The writer also described in great detail an installation for automatic weighing and feeding of raw materials into rubber mixers used in modern tire plants in Great Britain and in the United States and added that the construction of a similar automatic system in the USSR was delayed intolerably long and an experimental unit is only now being set up in the Voronezh Tire Plant. Discussing machinery used for the vulcanization of tire casings, the writer stated that the most modern equipment available are tire presses. These come in two different designs, the "autoform" and "Bag-o-matic" types, which, he intimated, should be adopted by the Soviet tire-making industry. "In introducing tire presses, it is necessary to replace old vulcanization equipment (autoclaves) with new, but it is impossible to do this immediately in all USSR tire plants. Therefore, they are mechanizing the recharging of autoclaves and molds, but these operations are being carried out too slowly." An example is the long delay in the designs for magnetic presses which were to be developed by the Yaroslavl Tire Plant and Rezinoproyekt, a rubber machinery design organization. The use of such modernized presses will significantly increase the productivity of labor. Also, "The general introduction of a system of complex mechanization of the finishing operations involved in the manufacture of tire casings, such as had been installed at the Moscow Tire Plant, is being intolerably delayed."

The article goes on to say that plants are not sufficiently mechanizing the assembly of tire casings and tubes, nor the tire storage and handling operations. Finally, it stressed the urgent need for installing electronic

devices to control the production of plies for tire casings, for automating the manufacture of precision-cut casing parts and for controlling the process of rubber-coating of tire cord. Owing to a number of design defects, the article stated, it is impossible to manufacture material of consistently accurate sizes on available calenders, whereas modern technology makes it possible to increase significantly the accuracy of calender operations. However, the several Soviet research institutes responsible for developing calenders and cutting machines are lagging badly behind in solving the problems of installing the necessary electronic control devices.

Difficulties were reported in 1956 at the Bolshevik Plant in Kiev. The plant was scheduled to design and produce 16 new and modernized models of tire-making machinery. Of these, only one was produced on schedule, and eleven were delayed for periods up to 4 months. This poor record was due to the inadequate organization of the design department and to inefficiency in industrial administration and supply. Significant also is a 1955 report from a Kirov tire plant that its machinery was mostly obsolete, but that the new machinery supplied to the plant was less productive than the old. The plant itself built 3 models of machines for assembling large tires apparently because it could not obtain the necessary machinery elsewhere.

2. Czechoslovakia

The Buzuluk Machinery Plant in Komarov is the only producer of tire-manufacturing machinery in Czechoslovakia. Among its products is a four-stage automatic vulcanizer press. This plant has supplied tire-building equipment to the USSR and in June of 1956 it completed negotiations for the sale of a "fully automatic tire plant" to Indonesia. Under the arrangement, Indonesian workers were to be trained by the staff of the Buzuluk Plant. Deliveries of equipment to Indonesia began in 1956 and ended in the fall of 1957. It is interesting to note that the Buzuluk Plant was one of several criticized by the Soviet press in 1957 for producing defective goods.

3. East Germany

The Ernst Thaelman Plant in Magdeburg, reportedly the largest heavy machinery plant in East Germany, produces various types of heavy equipment including tire-manufacturing machinery. Its product mix includes automatic tire heaters and presses (25 per month in 1955), rubber mixers (seven per month) and rubber rolling mills (30 per year). Most of the output is exported to the USSR, some to other European satellites. In addition, there is the report, referred to in section A above, of an East German offer to supply tire-making machinery to Uruguay.

4. Communist China

In recent years, China has begun the manufacture of tire-making machinery. A Chinese radio broadcast of October 1955 reported that the Dairen machinery plant manufactured numerous sets of machines for the tire industry - rubber mixers, smelters, and rubber cutting machines. These

machines were being produced for the first time in China and were all reportedly "automatically controlled." Several other Chinese plants manufacture a few types of tire machinery. The Chinese announced in April 1958 that "they must increase the number of types of rubber equipment and molds for automobile, bicycle, and cart tires, never fearing complexity, so that after two years we will basically be able to produce all rubber equipment." It appears to be a good guess that the two-year goal for self-sufficiency in "rubber equipment" is overly optimistic, and that China will continue to depend on imports for the more complex types of machinery available.

C. Outlook

There is no reason to doubt, that, given the necessary priority, the USSR heavy equipment industry could produce modern, up-to-date tire-making machinery. The obsolescence of models currently produced and the problems incurred in the design of new models is attributable largely to the presumably low priority accorded this type of machinery in the Soviet economy which concentrates its research and production efforts on the expansion of military and military supporting industries, and delays additional investments in less immediately important industries as long as their shortcomings do not interfere with priority projects or unduly impede the over-all progress of the economy. The ready availability of Western tire-making equipment of the latest design - such as is now actively being sought by the USSR - will mitigate, if not eliminate, a number of the production difficulties encountered by Soviet tire manufacturing industries. There is ample precedent for assuming that Russian engineers will carefully copy the new machinery and assembly lines received from the West and produce them in their own plants in sufficient quantities to meet growing requirements. In this manner, the Soviet tire-making industry can be completely modernized at a minimum of cost in terms of labor and materials, leaving research facilities and engineering skill free to pursue more strategically important projects

Table 1

Sino-Soviet Bloc Tire Production

1957

Country	Tire Prodn 1957	Planned Prodn 1960	Auto Prodn 1957	Truck Prodn 1957	Tires for New Vehicles	Auto Park 1 Jan 57	Truck Park 1 Jan 57	Tires For Park	Total	Status
USSR	12,800,000	20,400,000*	100,000	380,000	2,970,000	400,000	2,700,000	15,100,000	18,070,000	-5,27 [illegible]000
Czechoslovakia	2,750,000	3,000,000	32,000	14,400	246,400	110,000	75,000	815,000	1,061,400	[illegible]1,68[illegible]600
East Germany	1,450,000	2,050,000	30,000	15,500	243,000	110,000	116,000	1,020,000	1,263,000	[illegible] 18[illegible]000
Communist China	873,000	1,500,000	None	6,000	36,000	26,000	120,000	704,000	740,000	[illegible] 13[illegible]000
Poland	937,000	1,270,000	10,000	15,000	140,000	43,000	84,000	652,000	792,000	[illegible] 14[illegible]000
Rumania	200,000	360,000	None	1,575	9,450	8,000	17,000	117,000	126,450	[illegible] 7,550
Hungary	1,282,000	1,650,000	3,000	750	19,500	16,000	30,000	214,000	233,500	[illegible]1,048,500
Bulgaria	200,000	220,000	None	None	-	7,000	15,000	103,000	103,000	[illegible] 9[illegible]000
Albania	None	None	None	None	-	1,200	2,200	15,800	15,800	- 1[illegible]800
Totals	20,492,000	30,450,000	175,000	433,225	3,664,350	721,200	3,159,200	18,740,800	22,305,150	-1,81[illegible]150

* USSR plant 27,600,000 tires in 1965.

Note: Tire requirements were calculated on the basis of: New vehicles, autos, 5 tires; trucks 6 tires; park vehicles will require - autos 4 tires; trucks 5 tires. Requirements for buses, tractors, motorcycles and aircraft are believed to be less than 10 percent of total tire requirements. Since detailed statistics on production and requirements for such tires are not available, they have been excluded from the above tabulation as falling well within the margin of error of the estimates made.